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SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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WHAT DANTE DREAMED OF

Inner Pit, Halemaumau, Kilauea Volcano, Hawaii

(See page 84)

Vol. XVII No. 461

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To Explore Everglades From Air

General Science

National Park Service Plans Scientific Party

A BLIMP, baby sister of the big airships, will be added to the list of aircraft that have been used for purposes of scientific exploration when an official National Park Service party takes the air from Miami for a reconnaissance flight over the proposed Tropical Everglades National Park area on Tuesday, February 11. This small type of airship is regarded as especially well adapted for this particular kind of flight, for it is less likely than an airplane to get into difficulties in case of engine trouble, and is wieldier and less expensive to handle than a big dirigible.

An aerial reconnaissance will save an immense amount of time in getting an estimate of the possible adaptability of the southern Everglades to national park purposes. Miami people who know something of the region say that it is possible to see as much from the air in one day as one could from the ground in several weeks.

The exploring party will consist of Horace M. Albright, director of the U. S. National Park Service, Arno Cammerer, associate director, and a group of scientists versed in various phases of tropical botany, zoology, ornithology, etc. Their task will be to examine an area comprising approximately 2,500 square miles on the southern tip of Florida plus a number of small outlying islands. This land has been suggested as suitable for a national park. The party will make the report to the Secretary of the Interior, who may later be authorized by Congress to accept title to the land if it is offered as a gift to the United States. National parks are never created by Federal purchase, but only by the setting aside of public lands, as in the case of most of the western parks, or by the transfer of privately owned lands as a gift, as in the case of Acadia National Park and the new Great Smokies area.

The southern Everglades are of especial interest mainly because of the large elements of tropical life contained in their plant, insect, amphibian, reptile, bird and mammal populations. There are forms of life to be found here, especially on low coral-limestone ridges that rise in a sort of range, that exist abundantly across the salt-water channel of the West Indies but not to the north on the rest of the Florida mainland. Here can also be found the active geological processes of building up the land by corals, mangrove bushes and other agencies that turn water into land.

The area proposed for a new national park is almost wholly uninhabited. The Seminole Indians, who form a picturesque group in interior Florida, have their holdings to the north of this region, and their lands would not be disturbed. There may be a few of them, and possibly also a few white men and negroes, living within the area as squatters, but these could probably be compensated and removed without causing hard feelings or legal difficulties.

If the forthcoming exploration results in a recommendation of the area as coming up to national park standards, further action toward getting title to the land, preparatory to presenting it to the government, will be taken by the Floridians interested in establishing the new park.

Great Smokies

ONE hundred and fifty thousand acres of land in the heart of the Great Smoky Mountains region, forming the nucleus of the proposed new Great Smokies National Park, was formally turned over to the federal government on Thursday afternoon, Feb. 6. The deeds were delivered to the Hon. Ray Lyman Wilbur, Secretary of the Interior, by the Governors of the states of North Carolina and Tennessee in person.

The Great Smoky Mountains, which include the highest peaks in the southern Appalachians, lie along the boundary between Tennessee and North Carolina. Much of the area is still in virgin timber, its giant tulip-trees, buckeyes and hemlocks rating as the largest trees in eastern North America. Farther up the slopes of the mountains are dense forests of balsam and spruce, and where there has been cutting or fire, extensive second-growth stands of oak and pine have sprung up.

But the great glory of the vegetation of the Smokies lies in its shrubbery, especially in the great masses, often hundreds of acres in extent, known locally as "laurel slicks." These are composed mainly of rhododendrons, azalea and mountain laurel, the most beautiful of native American flowering shrubs.

The "slicks" are so called more because of their smooth and shining appearance from a distance than because of any slipperiness on close acquaintance. They are in fact dense jungles, higher than a man's head, and practically impossible to penetrate. It is often easier to tramp across their matted tops than to try to force a way between their close-set stems.

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First photograph of famous Sinanthropos skull, sent to U. S. National Museum anthropologist by Dr. Davidson Black, first investigator of this ancient Chinese race.

Peking Skull Declared Neanderthaloid

Anthropology

The skull of *Sinanthropos pekinensis*, or ancient Man of Peking, turns out to be no million-year-old ultra-primitive human type but apparently a comparatively recent and certainly a high-type Neanderthaloid cranium. This is the gist of the opinion of Dr. Ales Hrdlicka, noted anthropoligist of the U. S. National Museum, given to Science Service after he had examined a profile photograph of the much-controverted fossil sent him by Dr. Davidson Black of Peking Union Medical College, whose field work has resulted in the discovery of this new find of prehistoric man in China.

"The skull is decidedly a high-type Neanderthaloid," said Dr. Hrdlicka, "and the jaw of Peking Man is almost a duplicate of the fossil jaw designated as 'number g' from Krapina."

Krapina is a town in Yugoslavia, where some years ago a number of Neanderthal skeletons were discovered.

Dr. Hrdlicka received a cast of a molar tooth of Peking Man from Dr. Black some time ago, and has examined it critically. "In every imaginable point it is exactly similar to teeth that can be found in the jaws of modern men," he said. "Moreover, in the newly found jaw of *Sinanthropos* the third molar is reduced, and this is emphatically not a primitive condition; it is modern in character."

As for a relationship with *Pithecanthropus* the so-called ape-man of Java, he scouted the idea. "There is nothing in the specimen that would relate it to Java Man," he declared. "Furthermore, it is very doubtful whether the coining of a new generic, or even of a new specific name is justified at the present time."

A newly discovered organism, whether living or fossil, is set aside as a new genus when it is unlike any group known at the time, or as a new species if it plainly belongs to a known genus but fails to match up to any of the species within that genus. Should Peking Man finally prove to be identical with Neanderthal Man, he would have to share with the latter the name *Homo neanderthalensis*. In any case, Dr. Hrdlicka believes, the new specimen is enough like both Neanderthal and modern man to be included in the genus *Homo*, and his present scientific designation as *Sinanthropos pekinensis* (the Chinese man of Peking) should go into the discard.

In spite of the absence of the million-year-old background at first claimed for Peking Man, Dr. Hrdlicka is not in the least inclined to discount the importance of the discovery or to derogate the work of Dr. Black. On the contrary, he regards it as highly gratifying that a goodly fund of skeletal material, including one braincase in good condition, should have been discovered in China, far removed from the localities where the bones of Neanderthal Men, presumptive relatives of Peking Man, have been unearthed. He is hopeful that future researches will turn up still more material, and especially that more skulls may be found.

Peking Man has had his predecessors in Chinese archæology, and hints leading up to the recent discovery of a number of skeletons and one skull have been cropping up at intervals for several years.

The first signs of human habitation of China going back of even the hoariest of Chinese traditions appeared many years ago. Traders brought out a thin but steady stream of crude stone tools and weapons. They were obviously very ancient, but equally obviously they were of the New Stone Age—say 10,000 to 5,000 B. C. Anthropologists declined to become excited.

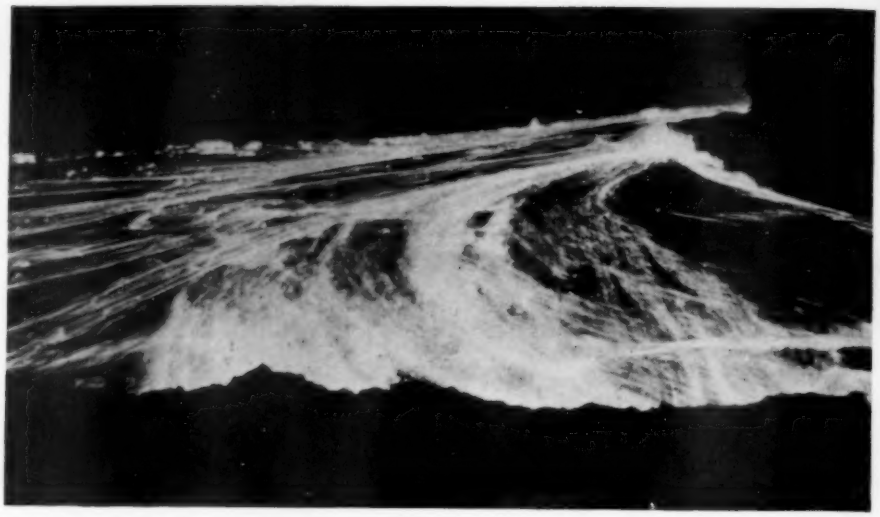
Then, a little less than twenty years ago, some scholarly Jesuit missionaries turned up a number of flint tools of the type known in Europe as Mousterian, from Le Moustiere in France, where workshops of the Neanderthalers were first discovered. This really was interesting, for it is a long jump from Peking to Le Moustiere. But still there were no actual human remains, and especially there were no skulls.

Four or five years ago the first bone of apparent human origin was discovered—a single tooth, somewhat worn. Assuming that the find represented a creature new to science, it was given the name *Sinanthropos pekinensis*. Prof. Black was responsible for the introduction to the world at large of this first dweller within the Celestial Kingdom, and he has been his leading examiner and protagonist ever since.

The discovery of the tooth was followed soon by the finding of two fragmentary skeletons, without skulls. This was important, because it established the right of the tooth to be called human without cavil. Some teeth do not fare so well. But the bones were so broken and incomplete that beyond firmly establishing the early presence of man in China they did little else.

The most recent find of course establishes the position of man in China at a very early time more firmly than ever. Whether Peking Man was the same man who made the Mousterian type tools found by the Jesuits remains unsettled. News on this point is something which cultural anthropologists in this country are awaiting with great eagerness.

Science News-Letter, February 8, 1930



What the volcanologist sees at night: a river of darkness, overstreamed with ribbons of fire.

In the Cause of Science

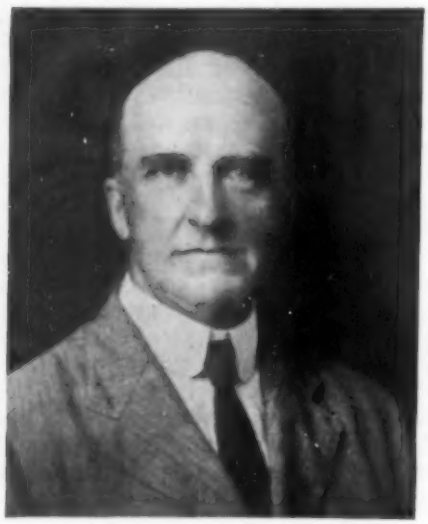
Volcano Watchers Brave Dragons' Breath

Volcanology

By Frank Thone

MYTH and saga of old time are full of tales of heroic mortals or demigods who braved the fuming, flaming breath of dragons to perform some epic deed—to recover a great treasure from its wrongful possessor, or to rescue a princess from dire peril. Perseus, Siegfried, St. George and many another stout-hearted paladin who feared not the most fearsome of all things—fire—hold well-merited places in the pantheon of youth.

Today, in this Twentieth Century of prosaic flivvers and plodding city-bound jobs, there has arisen a new generation of men who have no fear of dragons' breath. Unlike the heroes of old, who went forth with sword and lance for a single spectacular bout in the weird wilder-



Dr. T. A. Jaggar, pioneer American volcanologist, who has lived for seventeen years on the rim of Kilauea.

nesses where the monsters wound their ways, these new questors after the dragon treasure make their lives a continuous defiance. They leave the comfortable cities and go forth into the wilderness to stay for years, building their eyries high on the fire-flickering lips of the proudest and most terrible of all tellurian monsters—volcanoes. Impudently they cling there, making familiars of the Spirits of Air, Earth and Fire that attend these massive krakens, and of the strangely metamorphosed Water, usually Man's most comforting friend, but here become a veritable Djinn of mischief and menace. Puny in size by comparison, but with quick wit and immovable will, they make us think of the old tales of Thor and his friends among the giants of Jotunheim.

These dragon-defiers of the new times do not seek treasures, for volcanoes have neither gold nor gems. Such are kept by the cold mountains into whose entrails miners may gnaw without reproof. Neither do they seek damsels in distress—though often they bring their own wives with them to share their eyries, and to tend prosaic hearth and cooking fires within a long bowshot of the chimney-pots of the Inferno itself.

For volcano-watchers — volcanologists, they like to call themselves—make light of the perils of their trade, and declare that whoever knows his volcano is safer on the rim of its crater, or even down in its lava throat, than he would be on Broadway or Michigan Avenue. They give force and color to the age-old coolness of the Neapolitan and Sicilian peasants, who have for centuries tended vines and olive trees on the flanks of Vesuvius and Etna.

No, these unsearcable watchers of the ways of fire-mountains seek neither gold-haired princesses nor gold-crammed treasure caskets. None the less, they are after romance and treasure—the romance and treasure of scientific research. To them the command that was given to our oldest ancestors, "possess the earth," carries with it the implicit obligation to understand the earth; for possession without understanding is a vain thing.

And it is at the burning heart of a volcano that much understanding of the earth may be sought that can not be gained in any other place. These hills that build themselves, adding a cubit to their stature in an hour, or blowing their heads off in a moment of petulance, present tales of the making of the earth in rapid dramatic paragraphs that he who runs may read—and he does sometimes have to run quickly, at that!

Other mountains are of slower birth and more deliberate mode of death, and generations of men may clamber over them and study them at leisure. They can be left alone

from season to season—even from century to century; but he who would read the riddles of the swift and titanic releases of energy within a volcano must be on the spot when the play begins. And since no man knows the day or the hour when a volcano may decide to speak, it behooves the ambitious volcanologist to spend even his hours of sleep where he can leap out of bed like a cosmic fireman, and be on duty as quickly as he can pull on his boots.

Such places, regularly established and equipped volcano observatories, are relatively few, for the business of watching volcanoes, unlike the related business of watching the weather, is a comparatively new science and has as yet not developed a large trained personnel. The United States has only one volcano station, in spite of the fact that this nation owns more active volcanoes than any other—mostly in Alaska and the Hawaiian Islands. Very fittingly, however, this observatory has been built on our biggest crater, which is also the biggest active crater in the world, Kilauea.

Our observatory on this holy mountain of the ancient Kanakas is called, simply and appropriately, Volcano House. Here Dr. Thomas A. Jaggar and his assistants spend their days and large parts of their nights, when they are not actually down in the bottom of the crater itself, holding witches' councils on the edge of the huge fire-pit of Halemaumau, where the real fiery activity of the volcano is centered.

Volcano House is a solid and substantial laboratory, such as you might find on the campus of almost any college or technical school. In it are housed the physical and chemical apparatus needed for the observation of the behavior of Kilauea and for the analysis of the breath of the goddess Pelé, who lives in Halemaumau Pit. Here Dr. Jaggar and his helpers conduct their studies with no more excitement—save at times of eruption—than if they were studying the behavior of the blast furnaces at Pittsburgh or Gary. When an eruption comes, they do without sleep for a while, for the fireworks are too gorgeous to miss for a minute, and new data are belched out of the mighty mouth of the pit so fast that cameras, notebooks and recording apparatus must be at work incessantly.

But as for danger—Dr. Jaggar just laughs. He established this observatory in 1911, he points out, and he has been there ever since, except for visits to other volcanoes, and he hasn't been killed yet. He is so little concerned about mischief from Kilauea that he has built his dwelling-house only a little distance downhill from his laboratory and installed his wife therein, so that he can walk home comfortably to dinner after work.

The Jaggars have neighbors, too; there is quite a little community on the side of Kilauea. The others are mostly interested in plantations. Kilauea, you see, is a rather flat sort of volcano. It does not have the high, towering cone we usually think of in connection with these fire-mountains. Although its summit is about 4,000 feet above sea level, its slopes radiate outward for some 30 miles, so that the upward climb is very gradual. It is the kind of volcano sometimes referred to as "shield-shaped."

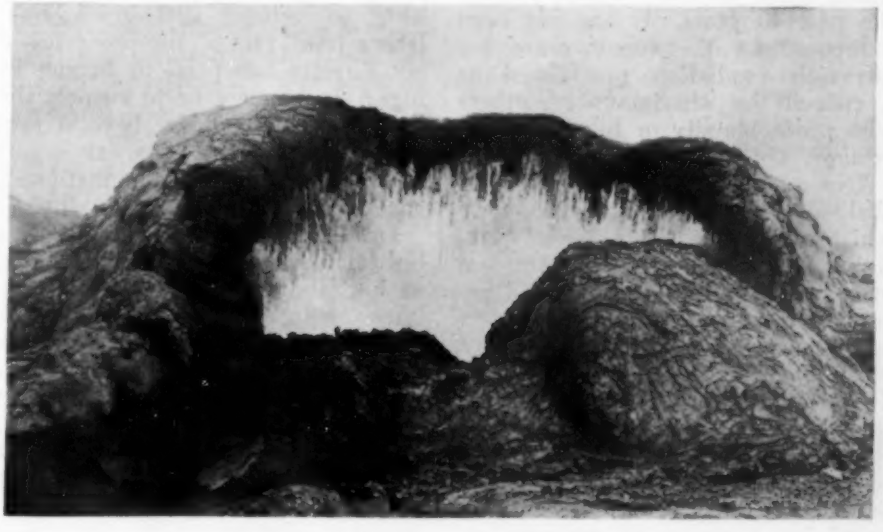
It is, moreover, a mild-mannered monster. It does not indulge in terrific explosions such as the one that smothered Pompeii and Herculaneum in 79 A. D., or the fearful outburst of Mt. Peleé that destroyed thousands of lives on Martinique in the opening years of the present century. It is a lava volcano, and when it has more energy than it can dissipate through the vent of Halemaumau, it pours forth its streams of molten rock through some secondary opening on its side. These sometimes devastate plantations, but they are so slow in their advance that there is plenty of time for people to get out of their way. So life on Kilauea is no more exciting than it is on Pike's Peak or the rim of the Grand Canyon.

But Dr. Jaggar was not the first of modern volcano observers. Volcanology as a science originated in Italy, where the name "volcano" itself originated centuries ago, when these smoking mountains were looked upon as the chimneys of Vulcan's subterranean blacksmith shop.

The most classic case of volcano study was that of the elder Pliny, who lingered on the scene during the destruction of Pompeii in his eagerness to observe the marvellous phenomenon, and paid with his life for his zeal after knowledge. His nephew, Pliny the Younger, has left a record of this first, and so far sole, martyr in the cause of volcanology.

It was therefore natural and proper that Italy's volcanological observatory should be erected on Vesuvius. The stone house, which might pass for a villa if it were on a less cindery hillside, could not be built at the exact summit. It stands some 2,000 feet lower down, and about a mile and half to the southwest of the crater's edge. A mountain-climbing electric line connects it with the city of Naples, the greatest human hive in Italy, for which this little building stands as a sort of sentry-box against the dragon coiled in uneasy and sometimes interrupted sleep under the mountain.

This, the pioneer volcano observatory of the world, is the only one that has been standing long enough to have had a succession of directors. Since the middle of the nineteenth century, when it was established, this dynasty (*Turn to page* 92)



Icicles of flame: a weird grotto formed within the crater of Kilauea, with dripping stalactites of lava.

Prof. Charles F. Scott, of Yale, who received the Edison Medal of the American Institute of Electrical Engineers.

Tungsten and Mercury Cooperate to Make Synthetic Sunlight

Engineering

Lighting for Health

A NEW era of artificial lighting, in which the importance of illumination as an aid to health as well as to vision will be considered, has now dawned, Dr. M. Luckiesh, director of the General Electric Company's lighting research laboratory at Cleveland, told the American Institute of Electrical Engineers. The first great era came with the beginning of artificial lighting with the burning of crude materials, he explained, and the second with the use of electricity in arc and incandescent lamps.

"This dream of simulating sunlight," said Dr. Luckiesh, "and dispensing whatever health benefits there are in midsummer sunlight, while providing light for vision, has its beginning in the impressive logic of sunlight as a powerful environmental factor. It has been stimulated by some sound scientific facts which have been unearthed during the past 40 years. It has not been influenced by the recent craze for ultraviolet radiation proclaimed as a cure-all by charlatans or others who profit blandly or blindly in the twilight zone of knowledge.

"No attempt will be made to marshal all the major scientific facts which emphasize the value of sunlight. Admittedly, these are far outnumbered by vague data and unsupported claims. Sunlight does cure and prevent rickets; therefore, it is important to the health of children. In some places the death-rate is highest in or shortly after the season when the sunlight is at its minimum. There is some evidence that fewer colds are experienced by a group of persons systematically exposed to artificial sunlight than by a group not exposed. Sunlight is closely related to one or two vitamins—possibly to all. The effect of a single exposure to powerful ultra violet radiation for only a few minutes can be detected for two and sometimes three months after.

"These are examples of facts having sound or only partial foundations. But beneath all this is the powerful logic of sunlight as an environmental factor upon which all life depends directly or indirectly. It has been bathing this earth since the most primitive life began. Plants have developed under its heat and light. Eyes have evolved to see by its energy of certain wavelengths. Vitamin D at least is manufactured by it. Thousands of photochemical reactions selectively utilize its energy of various wavelengths. Viewing the completed picture of which the foregoing is only fragmentary, is it possible to believe that sunlight—so interwoven into life-processes—is not directly beneficial to human beings? Is it not easy to suspect that its benefits extend far beyond present knowledge and even far beyond the ability of our imagination to encompass at the present time?"

Dr. Luckiesh described a new sunlight lamp that has been developed in his laboratory that closely simulates sunlight, both in color and health-giving powers. It gives light in three ways. At the bottom of the bulb is a little pool of mercury. When the lamp is turned on, the tungsten filament glows, and the heat vaporizes the mercury, then a mercury arc is formed between two tungsten electrodes, so that about 68 per cent. of the light comes from the glowing electrodes, 25 per cent. from the arc and the remaining 7 per cent. from the filament. The lamp is simple to use, though it requires a transformer to step down the ordinary lighting current to the 11 volts on which it runs.

This lamp, declared Dr. Luckiesh, is 50 times as effective in producing tanning of the skin, known medically as erythema, as midday midsummer sunlight of equal intensity. The quartz tube mercury vapor arc, sometimes used for medical purposes, is 500 times as effective, he said, but has the disadvantage of requiring the user to wear goggles while using it, in order to prevent serious eye trouble. The new lamp, he said, requires no more caution than one would use with midsummer sunlight. Its bulb is of glass, which cuts out some of the shorter, and more harmful, ultraviolet rays, but passes those which have the most beneficial effect.

Scott's Honor

FOR his pioneering work in electric transmission, which has made possible the widespread use of electricity today, Prof. Charles F. Scott, of Yale, was honored by electrical engineers of the country when he was awarded the Edison Medal of the American Institute of Electrical Engineers.

Prof. Scott in his acceptance speech pointed out some of the amazing benefits recently derived from electrical research.

"For the first time in history our machine production creates an abundance which makes it possible to eliminate poverty," he said, and went on to call attention to the fact that electricity is not only directed by men but it is actually taking the places of men. Automatic telephone exchanges are now used instead of operators, and automatic power houses and substation devices are supplanting station operators.

The medal, founded in 1904 by

friends and admirers of Thomas A. Edison, recognizes Prof. Scott as a leading electrical engineer of his generation. It recalls the fact that he was associated with engineers who built in Colorado the world's first long distance high voltage line. His name brings the Scott transformer, a connection he invented for changing two-phase power to three-phase, to the minds of engineers.

Prof. Scott, the nineteenth recipient of the medal, is a past president of the Amercian Institute of Electrical Engineers. He holds honorary degrees in arts from Yale, in sciences from the University of Pittsburgh and in engineering from Stevens Institute of Technology. He was born in Athens, Ohio.

Many prominent engineers and scientists have received the Edison Medal in the past, including George Westinghouse, inventor of the air brake; Robert A. Millikan, who isolated and measured the electron; Elihu Thomson, inventor of the watt-hour meter, the instrument which measures electrical energy; Michael I. Pupin, who first made long distance telephoning possible; and Alexander Graham Bell, inventor of the telephone.

R. E. Hellmund, chief electrical engineer of the Westinghouse Electric and Manufacturing Co., was awarded the Lamme gold medal of the American Institute of Electrical Engineers for 1930 for his "meritorious achievements in developing electrical machinery and apparatus." More than 300 United States and foreign patents cover Mr. Hellmund's inventions.

Air as Conductor

MORE knowledge about the mysterious high voltage phenomena of corona, a source of great losses in long distance transmission of electrical energy, was reported by Prof. Sigmund K. Waldorf, of Johns Hopkins University.

Prof. Waldorf was most successful in measuring with very sensitive instruments the power losses caused by corona and in recording its wave form. The results of his experiments form a valuable addition to the present paucity of literature on the subject.

Ordinary metals like copper and iron are conductors of electricity. But even air will carry electricity if there is enough voltage or pressure to force it from one conductor to another. As the voltage or potential between the conductors is increased the air begins to undergo changes. First, there is a dark discharge; current actually passes through the air but it cannot be seen. Then, with higher voltage, a glow is seen, and finally the discharge appears to be a number of sparks, called brush discharge.

Corona is manifest most on damp days when the conductivity of the air is great. Then it can be heard along high tension transmission lines as a loud humming, and the glow or brush discharge can sometimes be seen.

In his experiments Prof. Waldorf measured the corona loss from a wire conductor in the middle of a copper cylinder. He found that the loss from the wire across a 12 inch air radius to the cylinder per foot length is 25 watts, enough to light a small room.

Counting Health

A PORTABLE instrument which measures the intensity of the health giving ultraviolet rays by counting numbers on a meter was described by Dr. H. C. Rentschler, director of research for the Westinghouse Lamp Co.

The instrument makes use of a photoelectric cell with a uranium electrode which is sensitive to the ultraviolet rays that have the most healthful effect. The current flowing through it, which varies with the amount of light shining on it, charges a condenser. When the condenser, which holds electricity somewhat as a tank holds water, is filled, it overflows, or discharges, through a device known as a glow relay tube. This operates a relay, which in turn moves a counter up one number.

To use the instrument, the operator simply opens it up where the light is to be tested, and takes the number of counts in five minutes. In bright sunlight, said Dr. Rentschler, there will be a hundred counts in this period, while for half the intensity there will be fifty. If a longer record is desired, the counter can be connected to another device, which automatically counts the number of discharges in each five minute period over as long as thirty days.

Electrical Paradox

THE discovery of a material that will prevent the flow of electricity at low voltages and allow it to pass at high potentials, reported to the meeting by K. B. McEachron, General Electric engineer, gives the electrical industry a nearly ideal material for protecting its power lines from the great damage caused by lightning.

In normal times a lightning arrester of thyrite, the new material, will keep the current on the line. In storms, when lightning strikes, electricity will escape by way of the very arrester that so faithfully keeps normal power on the line.

Thyrite is a moulded compound including silicon carbide or carborundum. Figures on its relative cost compared with the cost of present types of lighting arresters have not been made public.

Each time the voltage across a piece of thyrite is doubled, the current increases 12.6 times. With practically all other substances current follows Ohm's law and is directly proportional to the voltage, so that doubling the voltage doubles the current.

Samples of the substance have a resistance of 50,000 ohms at 100 volts and less than half an ohm at 10,000 volts. They will carry lightning discharges as high as 30,000 amperes without any signs of distress.

The successful production of thyrite requires control of a large number of variables. The new material resembles black slate in color. It has mechanical properties similar to those of dry-process porcelain. In manufacturing, the material is moulded to the shape required and the contact surfaces are coated with metal by the Schoop metal-spraying process.

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K. B. McEachron and a cut-away lightning arrester containing thyrite, the dual-role substance which he made.

Quadruplets Wanted

Twins, triplets, Siamese twins, quadruplets, all may get an especially cordially invitation to the Chicago World's Fair in 1933, if the plans of Dr. H. H. Newman of the University of Chicago are followed.

Dr. Newman is a member of the biological committee which is planning science features for the exhibition. He believes that the fair offers a remarkable opportunity for science to get in touch with duplicate human beings. It is now realized that many problems of human physiology and behavior can be profitably attacked by study of human duplicates. Identical twins reared apart, for example, show in what ways environment does and does not alter an individual. Such separated twins are extremely rare.

Dr. Newman advocates establishing a bureau of twin research, and he believes that if many twins and triplets come to the Chicago exhibit, they could be shown the importance of helping science with their cases.

Anthropology
Science News-Letter, February 8, 1930

Evolutionist Honored

Lamarck, the great French scientist of the late eighteenth and early nineteenth century, who was Darwin's precursor in the field of evolution, is to have a memorial erected on the site of his birthplace by a committee of the Société Linneénne du Nord de la France. For nearly a hundred years after his death in 1829, he had no other monument than the house where he was born, in Bazentin, a village of the Somme. This was in the path of the heaviest fighting during the war and was completely demolished. The proposed monument is to be surrounded by a garden in which all the plants which have been named in honor of Lamarck or studied by him during his lifetime will be grown.

Evolution
Science News-Letter, February 8, 1930

Snow Fighters

Each countryside will have an organization of snow fighters, ready like a city fire department to get out on short notice day or night, if the plans outlined in a report to the American Road Builders' Association are carried out.

"Success depends on catching the snow before it is too deep or packed solid by traffic," the report explains. "Work should proceed on a definite plan and each man know his duties. The important roads should be opened up first. At the beginning of the snow season equipment should be placed at strategic points for snow removal."

Prevention of drifts is the greatest part of the program of snow-fighting. Engineers find that anything that causes a reduction in the velocity of the air carrying the snow will cause drifts, and recommend various measures from cutting weeds along the edge of the road to changing the location of the road itself, if topographic features nearby cause the snow to pile up unavoidably on the highway.

Temporary snow fences to make the snow drift in harmless places are found very efficient if carefully placed, the committee finds, and their use supplemented by scraping with high-speed trucks equipped with straight blade plows will keep traffic moving through the winter.

"The last ten years have seen a vast snow removal program inaugurated in the 36 so-called snow states," says the report. "Nowhere else in the world outside of cities is there anything to compare with it. The chief reason is found in the fact that the 22,000,000 people living in these states own two-thirds of all the automobiles in the world."

Engineering
Science News-Letter, February 8, 1930

Great Flood Dated

Ancient inscriptions unearthed from the ruins of Kish are confidently expected to set the date of the Great Flood of Biblical fame. A report just received from L. C. Watelin, field director of the Field Museum-Oxford University Joint Expedition to Mesopotamia, describes the discovery of the tablets and explains their extraordinary significance.

The inscriptions were taken out of a deeply buried layer of the ruins, the same layer which shows traces of having been inundated by a serious flood. The inscriptions now await a reading by Prof. Stephen Langdon of Oxford, the director-general of the expedition. If the writings fail to contain a specific date, Prof. Langdon will be able to fix the date approximately by study of the form of characters used by the scribes. This is possible because other writings have been found at the site. From study of these tablets, Prof. Langdon has identified the various forms of hieroglyphics employed in the different stages of the city's turbulent history.

The expedition has introduced an innovation into archaeological digging by applying modern hydraulic engineering methods on a large scale. Huge volumes of subterranean water are encountered about fifty feet below the original surface of the Kish mound. Hitherto, archaeology has had to give up when it met the water level. At Kish a large motor-driven pump has been connected with extensive pipe lines installed over a large area of the city site below the present water level.

After the water has been pumped away, digging will be resumed, and it is expected that the depth of excavations will exceed any ever made in Mesopotamia. Interest in these lowest levels is keen because the expedition did reach virgin soil in one small section, about sixty feet down, and just above this were found traces of Stone Age men who must have been the first inhabitants of the site.

Archæology
Science News-Letter, February 8, 1930

IN VARIOUS FI

Fruit Fly

The first warm weather in the South will see a renewal of the warfare waged by federal and state forces against the Mediterranean fruit fly after its discovery in central Florida in April, 1929.

So far as is now known, the outlying points of infestation discovered during the campaign of last spring and summer in Florida have been cleared of their last fly, and the area where the insect is likely to be seen again this year has been reduced to the territory where it was first discovered and where its initial development in this country probably took place. But federal entomologists do not feel that it will be safe to let these outlying areas go uninspected, because of the possibility that a few insects may have overwintered in some hidden corner. A single female laying a batch of eggs could start one of these infestations all over again.

In spite of the fact that not a single fly has been seen in Florida since last fall, it will be necessary to have a full force of men in the original infested area when the breeding season returns. The pest hibernates invisibily within any one of a number of fruits and vegetables, and even a series of chill nights much colder than Florida experi-

SCIENCE FIELDS

ences in the winter will not kill off all the brood.

The inspection force will need to be at work in the great peach belt of Georgia as well as in the citrus and truck regions of Florida. Peaches are just as fair game to the hungry grubs of the fruit fly as are oranges and grapefruit, and if the fly should once get started in Georgia it would not only work havoc in the peach orchards, but would be in a much more favorable position to begin a westward march than it now is, in its confined area within the Florida peninsula.

The Mediterranean fruit fly has become such a controversial matter in Florida, that the House Appropriations Committee purposes to hold exhaustive hearings in an effort to find out whether further government money for eradication work should be withheld.

President Hoover has recommended a special appropriation of fifteen million dollars. Department of Agriculture specialists say that the situation is precarious, and that unless more work is done now, previous eradication efforts may prove to have been in vain.

Some members of Congress, Rep. William R. Wood, of Indiana, chairman of the House Appropriations Committee, among them, are not convinced of the necessity of more money for the fight against the fruit fly.

The men who hold the purse-strings in Congress have decided that they will go right to the scene of the Mediterranean fruit fly's activities in Florida, before deciding definitely whether or not fifteen million more dollars are needed to suppress the activities of this insect.

By means of a resolution introduced by Chairman Wood of the House Appropriations Committee, the Chairman would be empowered to appoint a subcommittee to go to Florida and look the whole situation over. This resolution is expected to receive favorable action.

Entomology
Science News-Letter, February 8, 1930

Streamlined Air Passages

Money can be saved coal mine operators if they will smooth up and realign underground air passage ways, the University of Illinois Engineering Experiment Station announced.

"More power is required to force air through tunnels blocked with reinforcements and jagged walls than through those which have been more or less "streamlined", Cloyde M. Smith, research associate, reported.

In many cases five or more horsepower was required to force air the length of a city block. Since long passage ways must be kept open for years to furnish enough air to distant workings each minute, the saving becomes consideable.

Engineering
Science News-Letter, February 8, 1930

Smallpox

Serious concern is felt by state health officers over the unusual prevalence of smallpox which has existed in the middle western states since the first of the year, shown in reports received at the U. S. Public Health Service in Washington. The latest reports are that there were 269 cases in Ohio, 226 in Indiana, 147 in Illinois, 108 in Iowa, 60 in Missouri. 90 in Michigan and 38 in Wisconsin. Vaccination is a sure preventive of this loathsome and dangerous disease. Communities in which universal vaccination is the rule need not fear outbreaks of smallpox.

Medicine
Science News-Letter, February 8, 1930

French Scientists in Berlin

German scientists who are interested in the growth of friendly relations of Germany with France are welcoming the announcement of the French Ambassador to Germany, M. de Margerie, that his government will establish an institute in Berlin, to be the headquarters of French scientists conducting their researches there. M. de Margerie has himself been very active in promoting the enterprise. The institute, when established, will be placed under the direction of Professor Mesnard.

General Science
Science News-Letter, February 8, 1930

Radio In Every Room

Every school child in Shelby, Mich., is within constant touch with the outside world, or the voice of the superintendent of the schools, since a radio system for Shelby schools was dedicated and put into service on January 29.

Every schoolroom has three or more loud speakers placed in its walls and ceiling and the teacher has the choice of two programs or silence at any time.

Radio—Education
Science News-Letter, February 8, 1930

Safe Refrigerators

Speaking at Panama City in the tropics where refrigeration is such a great boon to health and comfort, Dr. Arnold Kegel, Health Commissioner of Chicago, at a meeting of the Pan-American Medical Association discussed factors which would make mechanical refrigerators safe for domestic use.

In Chicago, where 10 deaths and 29 cases of illness occurred recently from methyl chloride escaping from domestic refrigeration systems, the Department of Health has recommended an ordinance by which the amount of leakage from such a refrigerator that may occur into any habitable room is limited to two pounds in 12 hours, Dr. Kegel said.

"As a result of the consideration of this requirement in Chicago, four distinct types of safety features have already been suggested and in part put into practical operation, which when fully developed and put on a manufacturing basis will undoubtedly result in the construction of plants in which the common health hazards are eliminated," Dr. Kegel said.

Besides requiring the construction of a refrigerator which can not leak more than the specified amount, another important provision from a health standpoint is a regulation that all the toxic or poisonous refrigerants used in domestic refrigerators should have a distinct and easily recognizable odor in the small concentrations in air at which they are found to be poisonous to experimental animals after 12 hours' exposure, Dr. Kegel observed.

Because there are certain common locations of leaks, the construction of these refrigerators should be such that dangerous leaks are prevented by either shutting down of the system completely or by a type of construction that will conduct the escaping gas at any location to the outside air. Over three-fifths of the leaks in these refrigerators were found to occur around and in the evaporator; one-fifth of the leaks were in and around the compressor; and less than one-fifth were found in the refrigerant lines.

"The requirement for regidity and immobility of the refrigerant-containing parts is very essential in the prevention of dangerous leaks," Dr. Kegel stated. Rigid construction and anchoring of the evaporator in the refrigerator cabinet, and of the cabinet itself, are important requirements tending to prevent leaks.

Public Health
Science News-Letter, February 8, 1930

First Glances at New Books

PLANT ECOLOGY—John E. Weaver and Frederic E. Clements—*McGraw-Hill* ($5). Probably an overwhelming majority of plant ecologists are agreed that this is the most important single book in their field that has appeared in the English language since the translation of Warming's pioneer treatise a generation ago. The senior author developed the concept of succession, perhaps the largest single contribution American ecology has made, at about the same time, though independently of, the classical studies of Cowles. Prof. Weaver has built a world-wide reputation by his studies on the autecology of roots. The personal contributions of the authors receive full, but not obtrusive, treatment in a book which—brushing aside justifiable but minor criticisms—must fairly be designated a masterpiece.

Ecology
Science News-Letter, February 8, 1930

A GUIDE FOR THE STUDY OF PLANTS—Mabel E. Smallwood—*Heath* ($1). A second edition of a successful laboratory and field study guide for students in elementary botany.

Botany
Science News-Letter, February 8, 1930

MYSTERIOUS SAHARA—Byron Khun de Prorok—*Reilly and Lee* ($5). More a book of travel and exciting adventure than a record of scientific discovery. Experiences with the Tuareg are recounted. There is a running account of digging into abandoned sites in the Sahara. Excavation of a burial which Count De Prorok claims to be that of a woman and more specifically that of Queen Tin Hinan is graphically described.

Exploration
Science News-Letter, February 8, 1930

ELEMENTS OF PLANE GEOMETRY—W. H. Bruce—*Southern Pub. Co.* ($1.20). Another elementary geometry text that closely follows the conventional standard.

Mathematics
Science News-Letter, February 8, 1930

IMPRESSIONS OF SOVIET RUSSIA AND THE REVOLUTIONARY WORLD—John Dewey—*New Republic* ($1). A philosopher considers the areas of the earth, where civilization is in a state of flux. These New Republic articles reprinted provide a survey of the past revolutionary decade.

Sociology
Science News-Letter, February 8, 1930

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Wind Through Walls

WIND blows right through brick walls.

A well-laid 13-inch wall in the face of a 30 mile an hour wind will allow 14.75 cubic feet of air to pass through it every hour, G. L. Larson, D. W. Nelson and C. Braatz reported to the International Heating and Ventilating Exposition. This data is obtained from researches they have conducted at the University of Wisconsin.

But proper plastering with gypsum directly on brick, they find, will stop 96 per cent. of the leakage. Less air will leak through a wall which has been well constructed and in which all spaces between bricks are filled with mortar.

Houses are hard to heat during windy weather not only because cold air is blown in the cracks but also because heat actually leaves building material faster when a wind is passing by, heating engineers have found.

A seven mile an hour wind one degree colder than the surface it is blowing by will carry away three British Thermal Units of heat from each square foot of surface every hour, Frank B. Rowley, A. B. Algren and J. L. Blackshaw, of Minneapolis, Minn., reported, and a thirty mile wind under the same conditions will take eight heat units.

Their experiments have been conducted at the University of Minnesota as a part of cooperative research work between the American Society of Heating and Ventilating Engineers and the University.

RADIANT energy which has traveled more than 96,000,000 miles to become the cause of a serious problem for heating and ventilating engineers was the subject of a paper presented by F. C. Houghten and Carl Gutberlet, of Pittsburgh.

The engineers measured this energy which comes from the sun and their results closely checked those obtained by others. They found that on an ordinarily bright day in the smoky city of Pittsburgh a piece of black oilcloth 10 feet square would receive more than one horse power of energy from the sun. Expressed in terms of heat, this is about 45 British Thermal Units per minute—enough to heat a pound of water from the freezing point to 77 degrees Fahrenheit.

Heat that houses absorb in this manner in the summer constitutes the problem for engineers.

Engineering
Science News-Letter, February 8, 1930

Champion Star Distance Measurer

Astronomy

Astronomers Celebrate Dr. Mitchell's Thousandth Parallax

MEETING at Yale University on February 7, at the gathering of the Astronomical Neighbors, the leading astronomers of the East honored Dr. Samuel A. Mitchell, director of the Leander McCormick Observatory of the University of Virginia, the world's champion star distance measurer. Dr. Mitchell has just completed the measurement of 1000 star parallaxes, from which their distances are derived. This is over a hundred more than his nearest competitor and more than the next three combined. Dr. Frank Schlesinger, professor of astronomy at Yale, pioneer in the field, and Dr. Heber D. Curtis, director of the Allegheny Observatory at Pittsburgh, which has published over 800 such measurements, joined with other prominent eastern astronomers at the meeting.

Dr. Mitchell gives credit to Dr. Schlesinger for the development of the method that he used, measuring parallaxes from star photographs.

"The few of us who are parallax observers are all of us followers after Schlesinger," he told Science Service. "We depart from his method only in the details. An astronomer can now finish as many parallaxes in a year as was formerly possible in a lifetime using visual methods, while the accuracy of photographic work has reached the next decimal place."

It is the travel of the earth in its orbit around the sun that makes such measurements possible. A simple experiment shows the principle of the method. Hold your finger at arm's length in front of your face, so that it obscures some distant objects, like bricks in a wall. Close your eyes, one at a time, and notice how far the finger seems to move against the background. Now bring your finger nearer to your face, perhaps within ten inches, and close each eye again. Then, you will notice, the motion of the finger seems to be much greater.

Exactly the same method is used by the astronomer. Referred to the sun, the earth in June is some 186,000,000 miles away from where it is in December. The closer a star, the more it seems to move in six months, as seen against the background of very distant stars. By

Dr. Samuel Alfred Mitchell

taking photographs of the star under study, at six month intervals, and measuring its apparent motion on the two plates, its distance can be calculated. The apparent displacement of even the nearest stars is very small. Alpha centauri, the closest star, visible from the southern hemisphere, is displaced about a second and a half of arc by the earth's motion. This is about the angle that a quarter would make a little over two miles away. Actually, parallax measurements are expressed as the displacement from the center of the earth's orbit, and not from opposite sides, so that the parallax of alpha centauri is .758 second, corresponding to a distance of 24 trillion miles.

After centuries in which astronomers had tried to measure star distances in this way, but had been unsuccessful because of their inferior instruments, Friedrich Wilhelm Bessel, a German astronomer, measured the parallax of 61 Cygni in 1838. This is a faint star in the constellation of the Swan. During the following half century an average of one measurement a year was made, so minute are the quantities measured.

Over twenty years ago Dr. Schlesinger, then at the Yerkes Observatory, developed the photographic method. With the 40 inch refractor, still the world's largest lens telescope, he began the modern era of measurements, with previously unprecedented accuracy.

Since that time, the work has been carried on mainly by six observatories, the Leander McCormick, under Dr. Mitchell; the Yerkes Observatory, under Dr. Schlesinger and his successors; the Mt. Wilson Observatory, in California; the Allegheny Observatory of the University of Pittsburgh, under Dr. Curtis; the Sproul Observatory at Swarthmore College, of which Dr. J. A. Miller is the director; and the Greenwich Observatory, in London, England. Dr. Mitchell has now completed 1000 parallaxes, while Allegheny has just recently published their number 805. The remaining four, and some other observatories that have done a little of the work, have measured about 1400, making a total of some 3200 completed parallaxes. However, as many of these are of the same stars, so that the work of different observatories can be compared, there are only about 2000 separate stars of which the distances have been measured.

"This trigonometric method," said Dr. Mitchell the other day, "is the only direct method of measuring stellar distances. There are several very excellent indirect methods but their results must always be calibrated by means of the trigonometric parallaxes. There is no other way of standardizing them. . . . Since the Allegheny and McCormick observatories between them have measured the distance to most of the stars whose parallaxes are known by trigonometric methods, then it may almost be said that the dimensions of the universe depend upon the Allegheny-McCormick standard."

If they are wrong, then such figures as 900,000 light years, or 900,000 times six million million miles, which has been given for the distance of one of the nearest of the "island universes," are also wrong.

The "Astronomical Neighbors," at whose meeting the celebration was held, is a group of prominent eastern astronomers who meet occasionally at Yale, for informal discussion of their problems.

Science News-Letter, February 8, 1930

Amateur Recognized

ANNOUNCEMENT has just been made by the University of Chicago that George Langford of Joliet has been appointed Research Associate in the department of anthropology. This is done in recognition of the work Mr. Langford has accomplished in Illinois archaeology.

In spite of the exacting demands made upon his time and energy by his position as superintendent of a large steel mill at Joliet, Mr. Langford has carried on extensive and systematic excavations in the Indian mounds of the Joliet district, and has accumulated one of the best scientific collections from the upper Mississippi valley. In the Fisher mounds near Shanahan he found three superimposed Indian cultures, terminating in a layer that contained articles of French colonial manufacture in its upper portion, thus linking the mound-builders with historic times. Other excavations which he has conducted throw further light on the sequence of ancient Indian cultures in the Illinois valley, which has always formed the main highway between the Great Lakes and the Mississippi river.

Recently Mr. Langford presented his entire collection of mound-builder cultural and skeletal remains to the University of Chicago, where it is now being installed for exhibition and study.

"Old grads" of Yale remember George Langford as the best man who ever pulled an oar for their university, and as an outstanding performer on the gridiron in the days when football was football.

Archæology
Science News-Letter, February 8, 1930

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Volcano Watchers—*Continued*

of Italian watchers of the dragon has included L. Palmieri who observed the great eruption of 1872; R. V. Matteucci, witness of the eruption of 1906; Giuseppe Mercalli, a scholarly priest; and the present incumbent, Alesandro Malladra.

The claim of volcanologists that theirs is a safe occupation receives paradoxical support in the tragic but ironic end which befell Father Mercalli, the only one of the group who did not die a natural death. After defying for years the unweighable thousands of tons seething fire in his volcano, he was burned to death in his own study, by a pint of oil from an overturned lamp!

His successor, Signor Malladra, was an active member of the observatory staff at the time of his chief's tragic death, and remained as acting director until two years ago, when he was given full charge of the work. Dr. Henry Washington, a leading American volcanologist, knows Signor Malladra well and has spent many hours climbing the shifting scoria slopes of Vesuvius with him.

The most recent recruits to the task of keeping vigil over dragons have been the Dutch. Uncle Sam owns a lot of volcanoes, but most of them, like those in Alaska, are in uninhabited wilderness; so studying them is as "pure" a science as can be found in these days when even abstruse things like relativity are being put to practical use. But the volcanoes that are the unruly property of Her Gracious Majesty Queen Wilhelmina are located in one of the most densely populated and most richly productive regions in the world, and keeping watch over them is not only a matter of scientific interest but one of good hard guelders.

If you will look at a map of the Dutch East Indies, where the real wealth of Holland lies, you will see that Sumatra, Java, and the long line of smaller islands that trail off to the eastward, are really one continuous but partially submerged mountain range. The peaks that knot that range, like vertebrae in the backbone of an immense saurian skeleton, are almost all of them volcanoes, and there are many more volcanoes in Celebes, Dutch Borneo and other Dutch islands there in that corner between the Indian and Pacific oceans.

Hence the intense interest now displayed by the government in the development of volcanology in Java. With headquarters at the town of Bandung, under the shadow of three large volcanoes, the volcanological service has established a chain of seven observatories to watch seven other fire-mountains. Their names sometimes ring like the silver-bronze gongs of a Javanese orchestra, sometimes crash harshly like the dragon-voices of the mountains; Kawah Kamodjang, Kawah Idjen, Kelut, Merapi, Papandajan, Tankuban Prahoe, Krakatau.

Krakatau is a champion "bad volcano" of the East Indies. In 1883 this volcano simply blew itself and the small island on which it stood into bits, and snuffed out the lives of over 36,000 people. With the exception of the explosion of Tambora in the Sunda Islands in 1815, which killed 56,000, this was the worst eruption in history.

Papandajan, Kelut and Galungung are other "bad actors" among Javanese volcanoes, each with death-lists running into the thousands chalked up against it, though each has had but one major eruption during historic time. Merapi is responsible for fewer deaths, but has had three fatal eruptions in a little over a century; it is regarded as potentially very dangerous.

So the watching of the dragon goes. The little group of modern Siegfrieds will increase as time goes on. It will increase rapidly where governments realize, as the Dutch have, that there is something economic as well as "just scientific" to this business of sitting on a crater and watching the lava boil, and counting the landslides that tumble into it, and going down and measuring infernal temperatures and catching flasks of mephitic gases for analysis. In the end, we may be able to predict volcanic eruptions as we now predict storms and as we hope before long to predict earthquakes.

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The Pennsylvania State College has developed a correspondence course in "Elements of Mechanical Flight."

A Dane who is serving a term for larceny in a New York State prison has almost completed a Cornell correspondence course in poultry breeding, his lowest mark on a lesson being 99.

NATURE RAMBLINGS

By Frank Thone

English Sparrow

To get acquainted with most winter birds, one has to go out into the country, or at least into a large city park with plenty of undisturbed natural thickets in it. But the English sparrow obtrudes himself among the haunts of men by choice, and is little seen in the country. He is a town bird, a slum Cockney, tough, quarrelsome, dirty, impudent, and amazingly efficient at picking up a living out of the trash heap. Whatever possessed that misguided bird-lover three generations or so ago who first brought over some of these graceless little fowl and turned them loose to increase and multiply in the new world, is still an abiding mystery. Certainly if they had any friends in this country then, they haven't any now.

The sparrow is charged with destructiveness to fruits and berries designed for human consumption, but that is the least of his sins, and one of which he is no more guilty than many another more welcome bird. His chief offenses are first that he is such a messy nuisance with his ramshackle nests, which he can not be discouraged from rebuilding no matter how often they are destroyed, and second that he is such a bad neighbor to other birds. He fights them, raids their nests and destroys the eggs, and in general makes himself such a bully that eventually they move out for the sake of peace, leaving him in undisputed possession.

A notable decrease in the numbers of English sparrows has taken place, however, within the past half-generation. With the increase of motor cars and the progressive disappearance of horses, our streets have become much cleaner. And the sparrows, who used to fatten on the litter, are finding pickings much leaner than they used to be, and hence are not so much in evidence on the streets.

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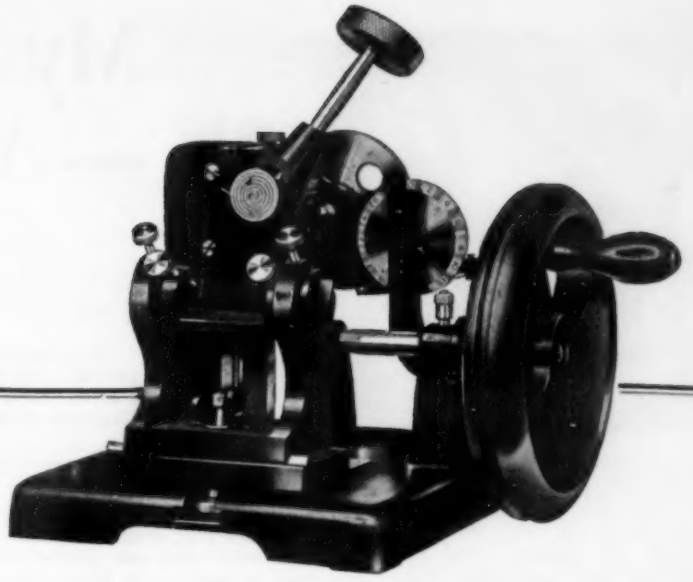

Minot Simplified Automatic Rotary Microtome

An improved Minot Rotary Microtome is offered by the Bausch & Lomb Optical Company. Upon the suggestion of Dr. Howard T. Karsner of the School of Medicine of Western Reserve University, the best features of the Standard Rotary Microtome, as sponsored by the late Dr. Charles S. Minot of Harvard University, and the best features of this type of microtome formerly made by the International Instrument Company have been combined to form one microtome of unusual features.

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The death of the gorilla. An illustration from Du Chaillu's book.

My First Gorilla —A Science Classic

Zoology

EXPLORATION AND ADVENTURES IN EQUATORIAL AFRICA: with accounts of the manners and customs of the people, and the chace of the gorilla, crocodile, leopard, elephant, hippopotamus, and other animals. By Paul B. Du Chaillu. London: 1861.

The interpretation of stories of gorillas carrying people off to their lairs in the jungle is not free from a certain amount of guess-work and one person's guess is as good as another's; these stories may well have originated in confusion in the minds of the natives between the behavior of apes and of human beings. This is the opinion of Dr. Charles Wardell Stiles, zoologist of the U. S. Public Health Service, authority on monkeys and the great apes. There is nothing strange about such confusion, he states, for early accounts of the apes, written by scientists, even as late as the end of the eighteenth century, contain instances of abnormal human beings classified among the apes and of chimpanzees mistaken for African pigmies. Indeed, a book published in 1550 goes so far as to state that the pigmies are apes, because they have no religion. There was a prevailing idea among certain people, Dr. Stiles finds, that the long-armed apes are half-breeds between human beings and orang-utans. But since "orang-utan" signifies "wild man of the forest," it is possible that some of the acts credited to apes may have been those of true "wild men." The male gorilla, barking and drumming on his chest, is a very powerful animal, and Dr. Stiles agrees with Du Chaillu that it is well to be sure your gun is in perfect condition when you are about to meet one either in the jungle or in Chicago.

FROM this elevation—about 5,000 feet above the ocean level—I enjoyed an unobstructed view as far as the eye could reach. The hills we had surmounted the day before lay quietly at our feet, seeming mere molehills. On all sides stretched the immense virgin forests, with here and there the sheen of a watercourse. And far away in the east loomed the blue tops of the farthest range of the Sierra del Crystal, the goal of my desires. The murmur of the rapids below filled my ears, and, as I strained my eyes toward those distant mountains which I hoped to reach, I began to think how this wilderness would look if only the light of Christian civilization could once be fairly introduced among the black children of Africa. I dreamed of forests giving way to plantations of coffee, cotton, and spices; of peaceful negroes going to their contented daily tasks; of farming and manufactures; of churches and schools; and, luckily raising my eyes heavenward at this stage of my thoughts, saw pendent from the branch of a tree beneath which I was sitting an immense serpent, evidently preparing to gobble up this dreaming intruder on his domains.

My dreams of future civilization vanished in a moment. Luckily my gun lay at hand. I rushed out so as to "stand from under," and, taking good aim, shot my black friend through the head. He let go his hold, and, after dancing about a little on the ground, lay dead before me. He measured a little over thirteen feet in length, and his fangs proved that he was venomous.

And now that Christian civilization of which I had mused so pleasantly a few minutes before received another shock. My men cut off the head of the snake, and dividing the body into proper pieces, roasted it and ate it on the spot; and I—poor, starved, but *civilized* mortal!—stood by, longing for a meal, but unable to stomach this. So much for civilization, which is a very good thing in its way, but has no business in an African forest when food is scarce.

When the snake was eaten, and I, the only empty-stomached individual of the company, had sufficiently reflected on the disadvantages of being bred in a Christian country, we began to look about the ruins of the village near which we sat. A degenerate kind of sugarcane was growing on the very spot where the houses had formerly stood, and I made haste to pluck some of this and chew it for the little sweetness it had. But as we were plucking my men perceived what instantly threw us all into the greatest excitement. Here and there the cane was beaten down, torn up by the roots, and lying about in fragments which had evidently been chewed.

I knew that these were fresh tracks of the gorilla, and joy filled my heart. My men looked at each other in silence, and muttered *Nguyla,* which is as much as to say in Mjongwe *Ngina,* or, as we say, gorilla.

We followed these traces, and presently came to the footprints of the so-long-desired animal. It was the first time I had ever seen these footprints, and my sensations were indescribable. Here was I now, it seemed, on the point of meeting face to face that monster of whose ferocity, strength, and cunning the natives had told me so much; an animal scarce known to the civilized world, and which no white man before had hunted. My heart beat till I feared its loud pulsations would alarm the gorilla, and my feelings were really excited to a painful degree.

By the tracks it was easy to know that there must have been several gorillas in company. We prepared at once to follow them. . . .

Looking once more to our guns, we started off. I confess that I never was more excited in my life. For years I had heard of the terrible roar of the gorilla, of its vast strength, its fierce courage, if, unhappily, only wounded by a shot. I knew that we were about to pit ourselves against an animal which even the leopard of these mountains fears, and which, perhaps, has driven the lion out of this territory; for the king of beasts, so numerous elsewhere in Africa, is never met in the land of the gorilla. Thus it was with no little emotion that I now turned again toward the

prize at which I had been hoping for years to get a shot.

We descended a hill, crossed a stream on a fallen log, and presently approached some huge boulders of granite. Alongside of this granite block lay an immense dead tree, and about this we saw many evidences of the very recent presence of the gorillas.

Our approach was very cautious. We were divided into two parties. Makinda led one and I the other. We were to surround the granite block behind which Makinda supposed the gorillas to be hiding. Guns cocked and in hand, we advanced through the dense wood, which cast a gloom even in midday over the whole scene. I looked at my men, and saw plainly that they were in even greater excitement than myself.

Slowly we pressed on through the dense brush, fearing almost to breathe lest we should alarm the beasts. Makinda was to go to the right of the rock, while I took the left. Unfortunately, he circled it at too great a distance. The watchful animals saw him. Suddenly I was startled by a strange, discordant, half human, devilish cry, and beheld four young gorillas running toward the deep forests. We fired, but hit nothing. Then we rushed on in pursuit; but they knew the woods better than we. Once I caught a glimpse of one of the animals again, but an intervening tree spoiled my mark, and I did not fire. We ran till we were exhausted, but in vain. The alert beasts made good their escape.

The gorilla as he appears in life—and in the British Museum of Natural History.

When we could pursue no more we returned slowly to our camp, where the women were anxiously expecting us.

I protest I felt almost like a murderer when I saw the gorillas this first time. As they ran—on their hind legs—they looked fearfully like hairy men; their heads down, their bodies inclined forward, their whole appearance like men running for their lives. Take with this their awful cry, which, fierce and animal as it is, has yet something human in its discordance, and you will cease to wonder that the natives have the wildest superstitions about these "wild men of the woods".

In our absence the women had built large fires and prepared the camp, which was not so comfortable as last night's, but yet protected us from rain. I changed my clothes, which had become wet through by the frequent torrents and puddles we ran through in our eager pursuit, and then we sat down to our supper, which had been cooked meantime. And now I noticed that, by the improvidence of the women, who are no better managers than the men (poor things!), all my plantains were gone—eaten up; so that I had to depend for next day—and in fact for the remainder of our passage to the Fan tribe—on two or three biscuits which, luckily, I yet possessed.

As we lay about the fire in the evening before going to sleep the adventure of the day was talked over, and of course there followed some curious stories of the gorillas. I listened in silence to the conversation, which was not addressed to me, and was rewarded by hearing the stories as they are believed, and not as a stranger would be apt to draw them out by questions.

One of the men told a story of two Mbondemo women who were walking together through the woods, when suddenly an immense gorilla stepped into the path, and, clutching one of the women, bore her off in spite of the screams and struggles of both. The other woman returned to the village sadly frightened, and related the story. Of course her companion was given up for lost. Great was the surprise, therefore, when, a few days afterward, she returned to her home. She related that the gorilla had misused her, but that she had eventually escaped from him.

"Yes," said one of the men, "that was a gorilla inhabited by a spirit."

Which explanation was received with a general grunt of approval.

They believe, in all this country, that there is a kind of gorilla—known to the initiated by certain mysterious signs, but chiefly by being of extraordinary size—which is the residence of certain spirits of departed negroes. Such gorillas, the natives believe, can never be caught or killed; and, also, they have much more shrewdness and sense than the common animal. In fact, in these "possessed" beasts, it would seem that the intelligence of man is united with the strength and ferocity of the beast. No wonder the poor African dreads so terrible a being as his imagination thus conjures up.

One of the men told how, some years ago, a party of gorillas were found in a cane-field tying up the sugarcane in regular bundles, preparatory to carrying it away. The natives attacked them, but were routed, and several killed, while others were carried off prisoners by the gorillas; but in a few days they returned home uninjured, with this horrid exception: the nails of their fingers and toes had been torn off by their captors.

Some years ago a man suddenly disappeared from his village. It is probable that he was carried off by a tiger; but as no news came of him, the native superstition invented a cause for his absence. It was related and believed that, as he walked through the wood one day, he was suddenly changed into a hideous large gorilla, which was often pursued afterwards, (*Turn to next page*)

The gorilla. An engraving forming the frontispiece of Du Chaillu's book.

My First Gorilla—*Continued*

but never killed, though it continually haunted the neighborhood of the village.

Here several spoke up and mentioned names of men now dead whose spirits were known to be dwelling in gorillas.

Finally was rehearsed the story which is current among all the tribes who at all know the gorilla: that this animal lies in wait in the lower branches of trees, watching for people who go to and fro; and, when one passes sufficiently near, grasps the luckless fellow with his powerful feet, and draws him up into the tree, where he quietly chokes him.

Many of the natives agree, I say, in ascribing to the animal this trait of lying in wait for his enemies and drawing them up to him by his "lower hands," as they may properly be called. But I have little doubt that this story is incorrect. Of course, the secluded habits of this animal, which lives only in the darkest forests, and carefully shuns all approach to man, help to fill the natives with curious superstitions regarding it.

This day we traveled fifteen miles, ten of which were easterly, and five to the southeast.

The next day we went out on another gorilla-hunt, but found no traces at all. . . .

NIGHT came upon us while we were still beating the bush, and it was determined to camp out and try our luck again on the morrow. Of course, I was only too glad. We shot some monkeys and birds, built our camp, and, while the men roasted their monkey-meat over the coals, I held my birds before the blaze on a stick. Fortunately we had food enough, and of a good kind, for next day.

We started early, and pushed for the most dense and impenetrable part of the forest, in hopes to find the very home of the beast I so much wished to shoot. Hour after hour we travelled, and yet no signs of gorilla. Only the everlasting little chattering monkeys—and not many of these and occasionally birds. In fact, the forests of this part of Africa—as the reader has seen by this time—are not so full of life as in some other parts to the south.

Suddenly Miengai uttered a little cluck with his tongue, which is the native's way of showing that something is stirring, and that a sharp look-out is necessary. And presently I noticed, ahead of us seemingly, a noise as of some one breaking down branches or twigs of trees.

This was the gorilla, I knew at once, by the eager and satisfied looks of the men. They looked once more carefully at their guns, to see if by any chance the powder had fallen out of the pans; I also examined mine, to make sure that all was right; and then we marched on cautiously.

The singular noise of the breaking of tree-branches continued. We walked with the greatest care, making no noise at all. The countenances of the men showed that they thought themselves engaged in a very serious undertaking; but we pushed on, until finally we thought we saw through the thick woods the moving of the branches and small trees which the great beast was tearing down, probably to get from them the berries and fruits he lives on.

Suddenly, as we were yet creeping along, in a silence which made a heavy breath seem loud and distinct, the woods were at once filled with the tremendous barking roar of the gorilla.

Then the underbrush swayed rapidly just ahead, and presently before us stood an immense male gorilla. He had gone through the jungle on his all-fours; but when he saw our party he erected himself and looked us boldly in the face. He stood about a dozen yards from us, and was a sight I think I shall never forget. Nearly six feet high (he proved four inches shorter), with immense body, huge chest, and great muscular arms, with fiercely-glaring large deep gray eyes, and a hellish expression of face, which seemed to me like some nightmare vision: thus stood before us this king of the African forest.

He was not afraid of us. He stood there, and beat his breast with his huge fists till it resounded like an immense bass-drum, which is their mode of offering defiance; meantime giving vent to roar after roar.

The roar of the gorilla is the most singular and awful noise heard in these African woods. It begins with a sharp bark, like an angry dog, then glides into a deep bass roll, which literally and closely resembles the roll of distant thunder along the sky, for which I have sometimes been tempted to take it where I did not see the animal. So deep is it that it seems to proceed less from the mouth and throat than from the deep chest and vast paunch.

His eyes began to flash fiercer fire as we stood motionless on the defensive, and the crest of short hair which stands on his forehead began to twitch rapidly up and down, while his powerful fangs were shown as he again sent forth a thunderous roar. And now truly he reminded me of nothing but some hellish dream creature—a being of that hideous order, half-man half-beast, which we find pictured by old artists in some representations of the infernal regions. He advanced a few steps—then stopped to utter that hideous roar again—advanced again, and finally stopped when at a distance of about six yards from us. And here, just as he began another of his roars, beating his breast in rage, we fired, and killed him.

With a groan which had something terribly human in it, and yet was full of brutishness, he fell forward on his face. The body shook convulsively for a few minutes, the limbs moved about in a struggling way, and then all was quiet—death had done its work, and I had leisure to examine the huge body. It proved to be five feet eight inches high, and the muscular development of the arms and breast showed what immense strength it had possessed.

My men, though rejoicing at our luck, immediately began to quarrel about the apportionment of the meat—for they really eat this creature. I saw that they would come to blows presently if I did not interfere, and therefore said I would myself give each man his share, which satsfied all. As we were too tired to return to our camp of last night, we determined to camp here on the spot, and accordingly soon had some shelters erected and dinner going on. Luckily, one of the fellows shot a deer just as we began to camp, and on its meat I feasted while my men ate gorilla.

I noticed that they very carefully saved the brain, and was told that charms were made of this—charms of two kinds. Prepared in one way, the charm gave the wearer a strong hand for the hunt, and in another it gave him success with women.

Punch Holes to Fit Scissors News-Letter Binder Cover